

WHAT IS CLAIMED IS:

1 1 Sub A2
2 A pointing device comprising:
3 a housing for supporting a user's hand;
4 a pointing sensor, mounted in said housing, for providing a pointing signal;
5 a contour on said housing for receiving a finger of said user, said contour
6 having curvature in at least one directions;
7 a solid-state touch sensor in said contour for detecting movement of said
finger along said.

1 2. The device of claim 1 wherein said contour comprises a trench shaped
2 to match a curve traced by a fingertip of said finger during a bending of said finger about a
3 knuckle of said finger.

1 3. The device of claim 1 wherein said touch sensor comprises:
2 at least two electrodes mounted in said contour; and
3 a capacitive detection circuit, connected to said electrodes, for detecting a
4 change in capacitance due to a contact of said finger with said electrodes.

1 4. The device of claim 1 further comprising:
2 wherein said touch sensor includes a plurality of discrete electrodes mounted
3 in said contour to detect movement of a finger, wherein at least first and second electrodes
4 are electrically connected, with a third electrode not connected to said first and second
5 electrodes, said third electrode being mounted where a finger will contact said third electrode
6 in between contacting said first and second electrodes; and
7 a circuit, connected to said electrodes, for detecting contact of said finger with
8 said electrodes.

1 5. The circuit of claim 1 wherein said touch sensor includes at least two
2 electrodes, and further comprising:
3 a circuit for detecting a contact with said electrode, including
4 a first, capacitive element;
5 a second element connected to said capacitive element;
6 a comparison circuit, having an input node connected to said capacitive and
7 second elements, for comparing a voltage at said input node to a threshold voltage;

8 a clamp-high circuit, connected to said node, for clamping said node high in
9 response to a clamp-high control signal;
10 a clamp-low circuit, connected to said input node, for clamping said node low
11 in response to a clamp-low control signal;
12 a controller, connected to an output of said comparison circuit, to said clamp-
13 high circuit and to said clamp-low circuit, for providing said clamp-high and clamp-low
14 control signals and generating an output signal in response to measuring an amount of time
15 between transitions of said output of said comparison circuit.

1 6. The device of claim 5 wherein the second element is a current source.

1 7. The device of claim 1 wherein said touch sensor comprises a scrolling
2 sensor, said scrolling sensor providing a scrolling command in response to a movement of a
3 users finger across said stationary sensor, and continuing to provide said scrolling command
4 in response to said finger reaching one end of said stationary scrolling sensor without lifting
5 off.

1 8. The device of claim 1 further comprising:

2 a sensory feedback element for providing feedback to a user corresponding to
3 an amount of movement of said finger in said contour.

1 9. The device of claim 8 wherein said sensory feedback element
2 comprises a plurality of tactile formations on a surface of said contour.

1 10. The device of claim 8 wherein said sensory feedback element
2 comprises a speaker mounted in said pointing device.

1 11. The device of claim 1 wherein said trench is at least partially
2 translucent, and further comprising a light emitting element mounted in said pointing device.

1 12. A pointing device comprising:
2 a housing;
3 a pointing sensor, mounted in said housing, for providing a pointing signal;
4 a plurality of discrete electrodes mounted on said housing to detect movement
5 of a finger, wherein at least first and second electrodes are electrically connected, with a third
6 electrode not connected to said first and second electrodes, said third electrode being

7 mounted where a finger will contact said third electrode in between contacting said first and
8 second electrodes; and
9 a circuit, connected to said electrodes, for detecting contact of said finger with
10 said electrodes.

1 13. A pointing device comprising:
2 a housing;
3 a pointing sensor, mounted in said housing, for providing a pointing signal;
4 at least one electrode mounted on said housing;
5 a circuit for detecting a contact with said electrode, including
6 a first, capacitive element;
7 a second element connected to said first, capacitive element;
8 a comparison circuit, having an input node connected to said first and second
9 elements, for comparing a voltage at said input node to a threshold voltage;
10 a clamp-high circuit, connected to said node, for clamping said node high in
11 response to a clamp-high control signal;
12 a clamp-low circuit, connected to said input node, for clamping said node low
13 in response to a clamp-low control signal;
14 a controller, connected to an output of said comparison circuit, to said clamp-
15 high circuit and to said clamp low circuit, for providing said clamp-high and clamp-low
16 control signals and generating an output signal in response to measuring an amount of time
17 between transitions of said output of said comparison circuit.

1 14. The device of claim 13 wherein the second element is a current source.

1 15. A pointing device comprising:
2 a housing for supporting a user's hand;
3 a pointing sensor, mounted in said housing, for providing a pointing signal;
4 a stationary scrolling sensor mounted on said housing, said scrolling sensor
5 providing a scrolling command in response to a movement of a users finger across said
6 stationary sensor, and continuing to provide said scrolling command in response to said
7 finger reaching one end of said stationary scrolling sensor without lifting off.

1 16. A method of capacitively detecting movement of a finger across a
2 plurality of electrodes on a pointing device, comprising:

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3 detecting, for each electrode, a first amount of time for a capacitance
4 connected to said electrode to charge up from a low voltage to a first threshold;
5 detecting, for each electrode, a second amount of time for said capacitance to
6 discharge from a high voltage to a second threshold; and
7 comparing said amounts of time to a calibration value corresponding to the
8 absence of a finger on said electrodes.

1 17. The method of claim 16 further comprising:
2 charging and discharging said capacitance faster than an AC frequency of an
3 AC power supply;
4 detecting said first and second amounts of time at least twice during a period
5 of said AC frequency to produce at least two measurement sets;
6 averaging said two measurement sets.

1 18. A pointing device comprising:
2 a housing for supporting a user's hand;
3 a pointing sensor, mounted in said housing, for providing a pointing signal;
4 a speaker, mounted in said pointing device, for emanating sounds
5 corresponding to a function of said pointing device.

1 19. The pointing device of claim 18 wherein said device is a mouse.

1 20. A pointing device for use with a computer system, comprising:
2 a housing for supporting a user's hand;
3 a pointing sensor, mounted in said housing, for providing a pointing signal;
4 and
5 a notification element, mounted in said pointing device, for providing a
6 notification to a user responsive to an event external to said computer system.

1 21. The pointing device of claim 20 wherein said device is a mouse.

1 22. The pointing device of claim 20 wherein said notification element is a
2 light emitter.

1 23. The pointing device of claim 22 wherein said light emitter blinks to
2 provide said notification.

1 24. The pointing device of claim 20 wherein said notification element is a
2 speaker.

1 25. A pointing device comprising:
2 a housing for supporting a user's hand;
3 a pointing sensor, mounted in said housing, for providing a pointing signal;
4 a solid-state touch sensor having at least two discrete electrodes, said
5 electrodes being separated with a portion of said housing in between said electrodes, said
6 sensor detecting movement of a finger from one electrode to another.

1 26. The pointing device of claim 1 further comprising:
2 a control circuit, in said pointing device, for detecting a speed of movement
3 between said two electrodes, and sending a movement signal to a computer for a number of
4 movements corresponding to said speed.

1 27. The pointing device of claim 26 wherein said movement signal
2 comprises a scrolling signal.

1 28. A pointing device comprising:
2 a housing for supporting a user's hand;
3 a pointing sensor, mounted in said housing, for providing a pointing signal;
4 a solid-state sensor for detecting movement of a finger across said sensor
5 using capacitive sensing with a galvanic contact by said finger.

1 29. The pointing device of claim 5 wherein said second element is a
2 resistive element.